

Prob. $\Rightarrow$ Consider the triangle formed by the Crank & C.R. of an I-C Engine as the two sides of the triangle. If the max^m area of this triangle occurs when the Crank is at 70° from LOS, the ratio of Crank radius to C.R. length is

- (a) 2.75 (b) 0.36 (c) 1.68 (d) 0.63

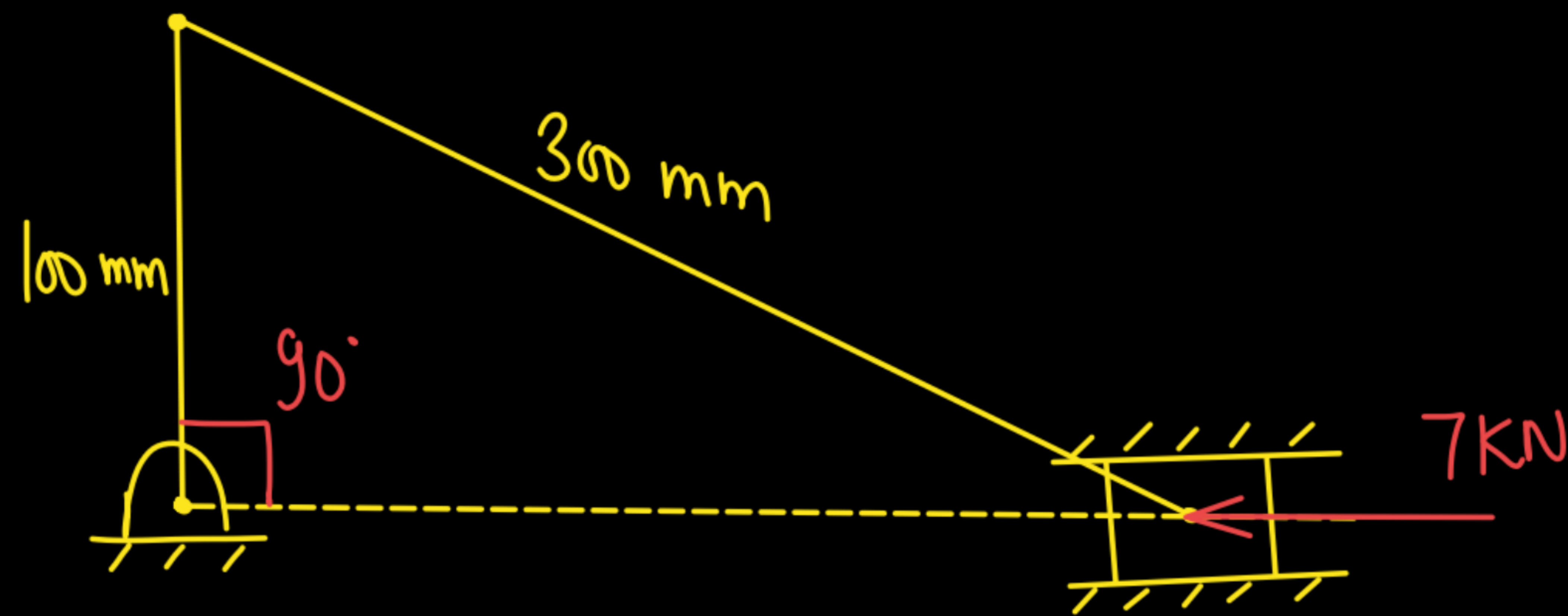
Qb.2 ⇒ A slider crank mechanism with crank radius 100 mm & C.R. length 300 mm is shown in figure. The crank is rotating at 10 rad/s in CCW dirⁿ. In the configuration shown, the crank makes an angle of 90° with the sliding dirⁿ of slider & force of 7 kN is acting on the slider. Neglect the inertia forces, the turning moment on the crank (in kN-m) is

(a) 7

(b) 0.7

(c) 5

(d) 0.5



Pb.3 ⇒ Match List-I with List-II & select the correct option

List-I

List-II

P Governor

1

Interference

Q Gears

2

Hunting

R Gyroscope

3

Reduces cyclic fluctuation of speed

S Flywheel

4

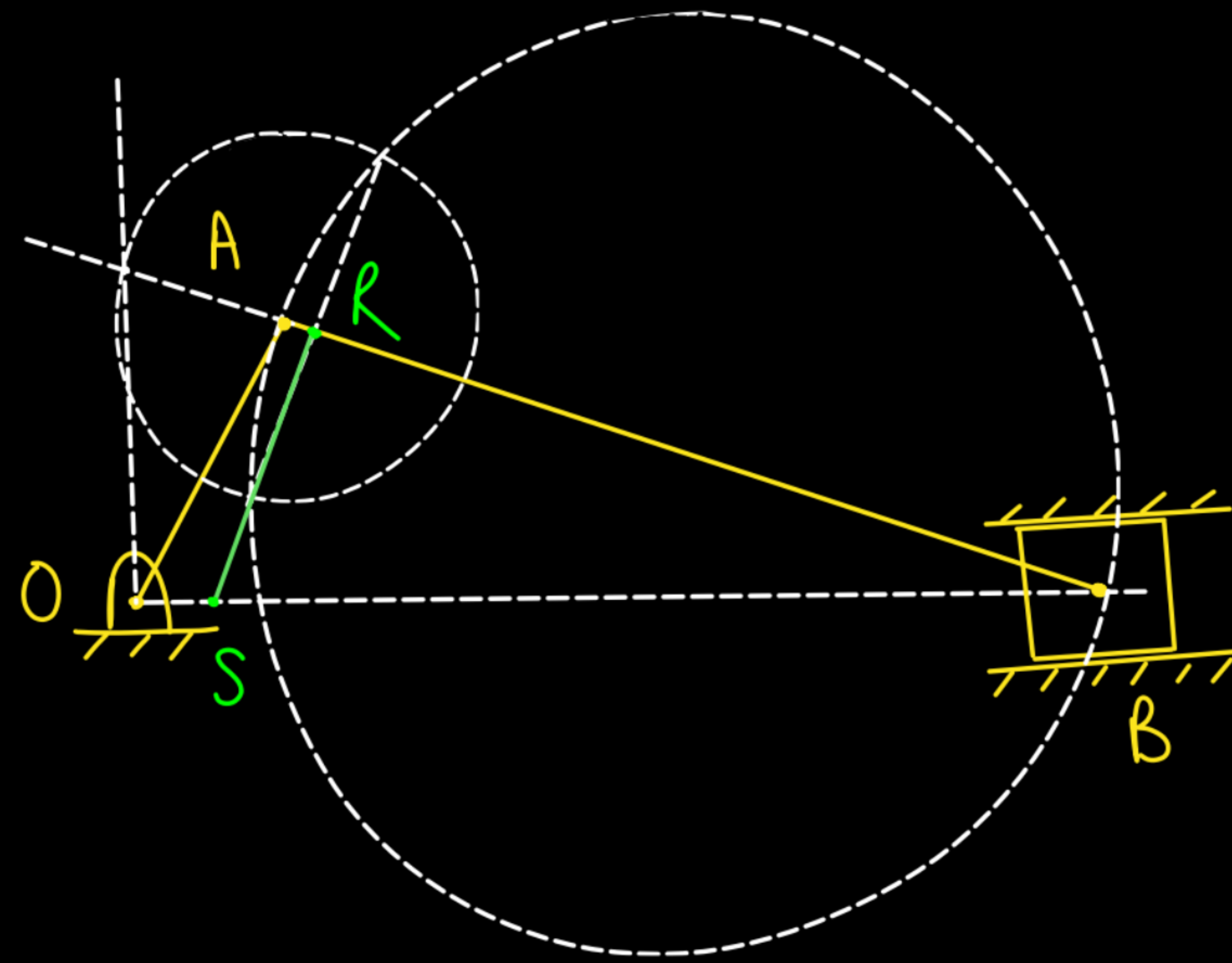
Precision

	P	Q	R	S
(a)	2	1	3	4
(b)	2	1	4	3
(c)	1	2	3	4
(d)	2	3	4	1

Qo.4 $\Rightarrow$ In a slider crank mechanism, if obliquity ratio i.e. n is very large & motion of piston is approximated as SHM then

- (a) Vel & accⁿ both are max^m at start of stroke.
- (b) Accⁿ is max^m at start & vel is max^m at mid of stroke.
- (c) Vel & accⁿ both are max^m at end of stroke.
- (d) Accⁿ is max^m at mid & vel is max^m at start of stroke.

Q.5 $\Rightarrow$ The given figure shows the Klein's Construction for acc^n drawn to full scale. What acc^n does RS represent.



- (a) Acc^n of Point A
- (b) Tangential acc^n of Point B w.r.t A
- (c) Acc^n of slider
- (d) Radial acc^n of Point B w.r.t A

pb.6 $\Rightarrow$ A flywheel of M.O.I $\frac{30}{\pi^2} \text{ kg-m}^2$ fluctuates by 30 rpm for fluctuation of Energy 500 J. The mean speed of the flywheel is (in rpm)

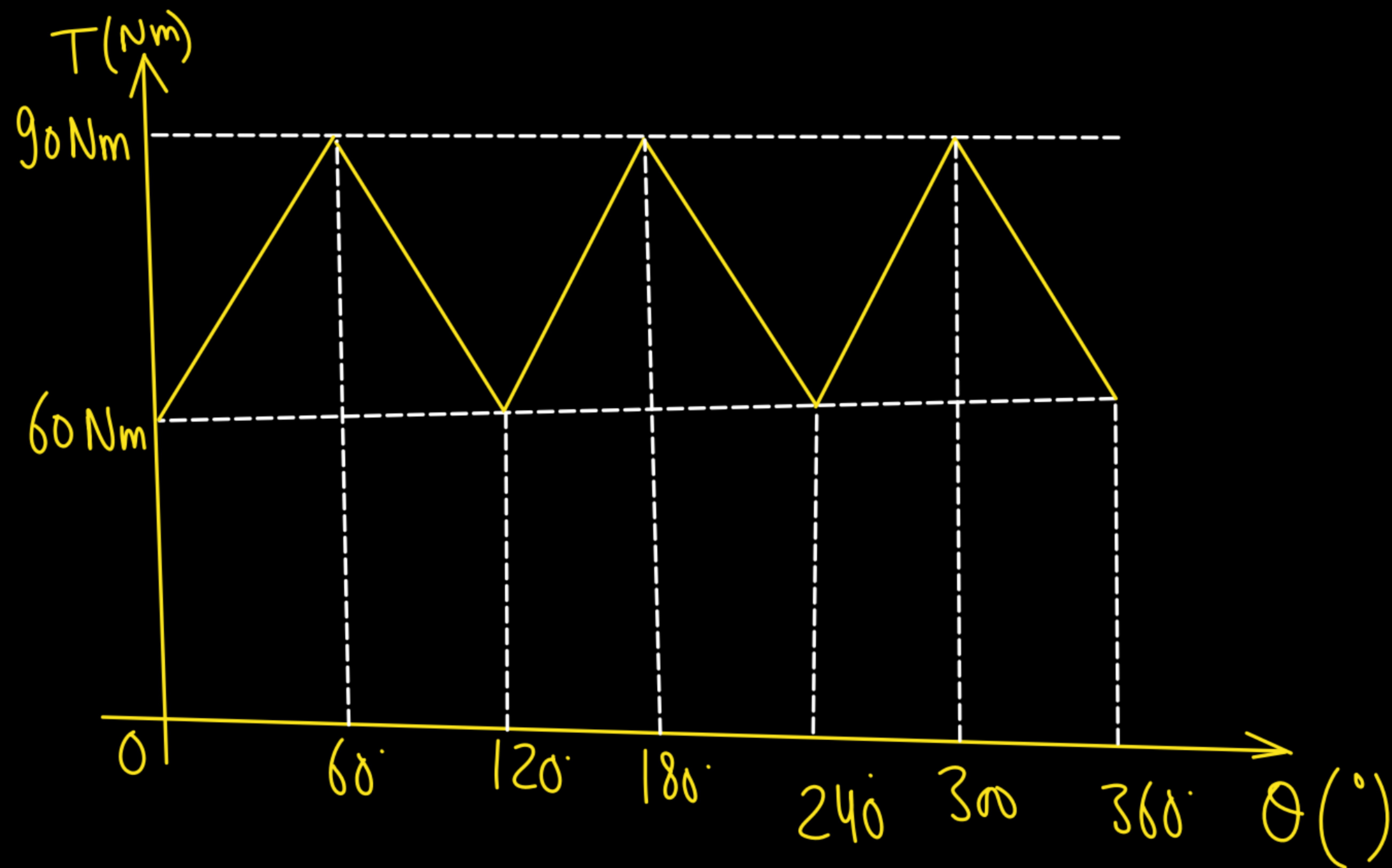
- (a) 100 (b) 500 (c) 300 (d) 400

pb. 7 $\Rightarrow$ The torque (in N-m) exerted on the crank-shaft of a two-stroke engine can be described as $T = 5000 + 500 \cos 2\theta - 600 \sin 2\theta$, Where θ is the crank-angle as measured from IDC position. Assuming resisting torque to be uniform, the power (in KW) developed by the engine at 20 rad/s is

- (a) 50 (b) 100 (c) 70 (d) 120

Pb. 8 $\Rightarrow$ Turning moment diagram of a 3-cylinder single acting engine is given as shown in figure. The engine runs at 300 rpm. The Coeff of fluctuation of speed in %, if mass of flywheel is 12 kg & radius of gyration is 60 mm, is

- (a) 0.1842 (b) 18.42 (c) 2.5 (d) 0.25



pb.9 $\Rightarrow$ The machine (coupled to a power source) receives torque (in Nm) as $500 + 100 \sin 2\theta$. Mass M.O.I. of the flywheel is 200 kg-m^2 . What is the max^m α of flywheel & at what position does it occur?

- (a) 0.5 rad/s^2 at $\theta = 90^\circ$
- (b) 0.5 rad/s^2 at $\theta = 45^\circ$
- (c) 1 rad/s^2 at $\theta = 90^\circ$
- (d) 1 rad/s^2 at $\theta = 45^\circ$

Qo. 10] The flywheel of a steam engine has a radius of gyration
of 1 m. The flywheel of a steam engine has a radius of gyration
is 2 m. Qo. 10] The flywheel of a steam engine has a radius of gyration
start of 1 m & mass 1000 kg. The starting torque which is constant
(a) 200 is 2000 N-m. The K.E. of the flywheel after 10 s from
start is

- (a) 200 J (b) 200 kJ (c) 100 kJ (d) 100 J

Prob. 11 An electric motor drives a punching press. A flywheel fitted to the press has a radius of gyration 0.4 m , mass 200 kg & runs at 300 rpm . The press is capable of punching 800 holes/hr with each punching operation taking 1.5 s & requires 12000 J of work. The energy delivered by the motor during punching operation is

- (a) 8000 J (b) 4000 J (c) 5000 J (d) 12000 J